

Appl. No. 10/002,101
Amendment dated June 13, 2003
Reply to Office Action of March 26, 2003

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This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of claims:

1. (currently amended): An aqueous-based preservative concentrate for use in treating lignocellulosic-based materials comprising:
- (a) a borate selected from the group consisting of ammonium borate and alkali metal borate, wherein the concentration of said borate, expressed as sodium tetraborate decahydrate equivalent, comprises at least about 15% by weight of the concentrate,
 - (b) a source of metal, wherein said metal is selected from the group consisting of copper, zinc and a combination thereof, and wherein the concentration of said metal, expressed as metal oxide equivalent (CuO and/or ZnO), comprises at least about 5% by weight of the concentrate,
 - (c) a volatile organic acid or salt thereof, wherein said acid has a boiling point below about 150°C, and wherein the molar ratio of the volatile organic acid to said metal is in the range of about 0.1 to 0.4:1,
 - (d) a source of free ammonia,
 - (e) an ammonium salt,
 - (f) a source of carbonate, and
 - (g) water

wherein the weight ratio of the borate, expressed as sodium tetraborate decahydrate, to the metal, expressed as metal oxide, is at least 1:1, the concentration of total ammonia, including the sum of free ammonia and ammonia as ammonium salt, is at least 5% by weight of the concentrate, and wherein said concentrate has a pH greater than 8.0.

2. (original): The preservative concentrate according to claim 1 wherein the volatile organic acid is selected from the group consisting of formic acid, acetic acid and propionic acid.

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3. (original): The preservative concentrate according to claim 1 wherein the ammonium salt is selected from the group consisting of ammonium carbonate and ammonium bicarbonate.
4. (original): The preservative concentrate according to claim 1 wherein the source of free ammonia is selected from the group consisting of ammonia gas and ammonium hydroxide.
5. (original): The preservative concentrate according to claim 1 wherein the borate is a sodium borate.
6. (currently amended): The preservative concentrate according to claim 1 wherein the borate is ~~a~~ sodium tetraborate decahydrate.
7. (original): The preservative concentrate according to claim 1 wherein the source of carbonate is selected from the group consisting of carbonate salts, carbon dioxide and carbonic acid.
8. (original): The preservative composition according to claim 1 wherein the pH of the composition is between about 9.5 and 11.5.
9. (original): The preservative composition according to claim 1 wherein the weight ratio of the borate, expressed as sodium tetraborate decahydrate, to the metal, expressed as metal oxide, is at least about 2:1.
10. (original): The preservative concentrate according to claim 1 wherein the metal is fully dissolved and the borate is partially dissolved and partially dispersed in the concentrate.
11. (original): The preservative concentrate according to claim 1 wherein the source of metal is selected from the group consisting of metal carbonate, metal oxide, metal hydroxide and

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elemental metal.

12. (original): The preservative concentrate according to claim 1 wherein the source of metal is selected from the group consisting of copper carbonate, zinc carbonate and zinc oxide.

13. (original): The preservative concentrate according to claim 1 comprising about 9.8% by weight B_2O_3 equivalent, about 11.8% by weight CuO equivalent and about 9.4% by weight ammonia as ammonium hydroxide.

14. (original): The preservative concentrate according to claim 13 wherein the borate is sodium tetraborate decahydrate and the source of metal is copper carbonate.

20 15. (currently amended): A preservative wood treatment solution comprising:

- (a) a borate selected from the group consisting of ammonium borate and alkali metal borate, wherein the concentration of said borate, expressed as sodium tetraborate decahydrate equivalent, is in the range of between about 1.2 and 2% by weight of the solution,
- (b) a source of metal, wherein said metal is selected from the group consisting of copper, zinc and a combination thereof, and wherein the concentration of said metal, expressed as metal oxide equivalent (CuO and/or ZnO), is in the range of between about 0.5 and 1.5% by weight of the solution,
- (c) a volatile organic acid or salt thereof, wherein said acid has a boiling point below about 150°C, and wherein the molar ratio of the volatile organic acid to said metal is in the range of about 0.1 to 0.4:1,
- (d) a source of free ammonia,
- (e) an ammonium salt,
- (f) a source of carbonate, and
- (g) water

wherein the weight ratio of the borate, expressed as sodium tetraborate decahydrate, to the metal,

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expressed as metal oxide, is at least 1:1, and wherein said solution has a pH greater than 8.0.

21 ~~16~~²⁰ (original): A preservative wood treatment solution according to claim ~~15~~²⁰ wherein the metal is copper and the concentration of copper, expressed as percent CuO is between about 0.75% and about 1.0% by weight.

22 ~~17~~ (currently amended): A method for preparing the an aqueous-based borate- and metal-containing preservative concentrate according to claim 1 comprising the following steps:

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- (a) adding the a volatile organic acid or salt thereof, wherein said acid has a boiling point below about 150°C, and wherein the molar ratio of the volatile organic acid to said metal is in the range of about 0.1 to 0.4:1, and a source of free ammonia into water and mixing until an integrated mixture is obtained;
 - (b) adding the a source of said metal, wherein the metal is selected from the group consisting of copper, zinc and a combination thereof, and wherein the concentration of said metal, expressed as metal oxide equivalent (CuO and/or ZnO), comprises at least about 5% by weight of the borate- and metal-containing preservative concentrate, and an ammonium salt to the integrated mixture, wherein at least one of the source of metal and ammonium salt is added in the form of a carbonate or bicarbonate thereby providing a source of carbonate, and mixing until the metal is completely dissolved to form a metal-containing concentrate; and
 - (c) mix the adding borate selected from the group consisting of ammonium borate and alkali metal borate, wherein the concentration of said borate, expressed as sodium tetraborate decahydrate equivalent, comprises at least about 15% by weight of the borate- and metal-containing preservative concentrate, and mixing into the metal-containing concentrate until all of the borate has dissolved or dispersed,

thereby forming the an aqueous-based borate- and metal-containing preservative concentrate of claim 1 having a weight ratio of borate, expressed as sodium tetraborate decahydrate, to metal,

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expressed as metal oxide, of at least 1:1, a concentration of total ammonia, including the sum of free ammonia and ammonia as ammonium salt, of at least 5% by weight, and a pH of greater than 8.0.

23 ²² 18. (original): The method according to claim ²² 17 wherein the borate is sodium tetraborate decahydrate.

24 ²² 19. (original): The method according to claim ²² 17 wherein the metal-containing concentrate is shipped or stored before adding the borate.

A1 ¹⁵ 20. (currently amended): A method for preserving wood comprising the steps of: (a) diluting the preservative concentrate according to claim 1 with water to form a preservative treatment solution; (b) applying the treatment solution to wood ~~such so~~ that the solution penetrates into the wood; (c) drying the wood ~~such so~~ that there is deposited in the wood a biocidal amount of borate and a co-biocidal metal fixative.

16 ¹⁵ 21. (original): The method according to claim ¹⁵ 20 wherein the treatment solution is applied to wood using vacuum and/or pressure techniques.

17 ¹⁵ 22. (original): The method according to claim ¹⁵ 20 wherein the treated wood is kiln dried or heat treated.

18 ¹⁵ 23. (original): A treated wood product produced by the method of claim ¹⁵ 20 whereby said wood product contains a biocidal amount of borate and a co-biocidal metal fixative, thereby making the wood resistant to attack by wood destroying organisms.

19 ¹⁸ 24. (original): A treated wood product according to claim ¹⁸ 23, having an outer surface, wherein said outer surface is substantially free of surface deposits from the preservative treatment solution.